

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-4 and 8-10 are pending in the application, with claim 1-3 being the independent claims. Claims 5-7, being drawn to nonelected inventions, are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. New claims 8-10 are sought to be added. Support for new claims 8-10 appears, for example, at paragraph [0065] in the application as filed. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Rejections under 35 U.S.C. § 112

Claims 1-4 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite because the recitations of the phrase "characterized in that should read "wherein." Appropriate correction has been made to these claims. Applicants therefore respectfully request the rejection be withdrawn.

Rejections under 35 U.S.C. §§ 102 and 103

Rejection of claims 1-3 and cited references Gorelov and Irie

Claims 1 and 2 were rejected under 35 U.S.C. §102(b) as being anticipated by Physica A (1998) 249(1): 216-225 to Gorelov et al ("Gorelov"). Claim 3 was rejected

under 35 U.S.C. §103(a) as being unpatentable over Gorelov in view of U.S. Patent No. 6,387,235 to Irie *et al.* ("Irie"). The Examiner asserts that Gorelov teaches a cationic surfactant interacts with DNA by displacing positively charged bound counterions (i.e., sodium counterions) (see pages 223-224 of Gorelov). By this rejection, we assume that the Examiner considers the counterions of Gorelov to be "an impurity" in a sample containing nucleic acid, as claimed. The Examiner asserts that the displacement by the cationic surfactant of the counterion on the DNA is considered to *adjust* the electric charge of the previously bound counterions as required by the claims. With respect to claim 3, the Examiner asserts that Irie teaches use of a nonionic surfactant in the separation of DNA by capillary electrophoresis, and that it would have been obvious to include a nonionic surfactant in the method of Gorelov. Applicants respectfully traverse this rejection.

We do not agree with the Examiner's evaluation. The method of the invention is directed to surfactant binding to non-nucleic acid contaminants. In contrast, Gorelov is concerned with the binding of surfactant to DNA, and not with contaminants in the DNA preparation (*see* Conclusions, pg 224 of Gorelov). Gorelov states he is attempting to examine the binding of surfactant to relatively short fragments of DNA (*see* pg 217, 1st full paragraph, of Gorelov), as opposed to purifying DNA. Gorelov teaches that the binding of the surfactant to the DNA decreases the electrophoresis mobility of the DNA, and that the surfactant may continue to bind to the DNA without counterion exchange (*see* pg 224 of Gorelov). Gorelov does not purify DNA from the counterion, and the sodium counterion is not an impurity. Accordingly, Gorelov does not disclose adjusting

the charge of an impurity in a nucleic acid sample and then concentrating and purifying the nucleic acid in an electric field, as provided by claims 1-3.

Applicants therefore respectfully request the rejection be withdrawn.

Rejection of claims 1-4 and cited references Sheldon and Asai

Claims 1-4 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,129,828 to Sheldon, III *et al.* ("Sheldon") in view of U.S. Patent No. 6,165,758 to Asai ("Asai"). The Examiner asserts that Sheldon teaches separating nucleic acids from impurities using electrophoresis, and that the charge of contaminants can be altered to permit their separation from the desired nucleic acids. Sheldon teaches using protein traps that can include surfactants, in order to remove these contaminants. The Examiner indicates that Sheldon is silent as to using a surfactant to modify the charge of the contaminants, but that Asai teaches using surfactants to cause precipitation of contaminants from an enzyme. Applicants respectfully traverse this rejection.

Independent claims 1-3 each provide that the electric charge of an impurity is adjusted, "*and then* the sample is placed in an electric field so as to concentrate and purify the nucleic acid." Neither Sheldon nor Asai teach this feature. Sheldon teaches using a trap in a spacer compartment disposed between the sample input port and an outlet tap in order to trap contaminants. In Sheldon, a sample is placed in the central chamber 12, an electric field is applied, whereby the contaminants move to the spacer compartment 16 where they may be trapped. See col. 13, lines 15-25, and FIG. 1 of Sheldon. Accordingly, Sheldon does not teach *first* adjusting the charge of an impurity

in a sample *and then* placing the sample in an electric field, as required by the claims.

Applicants therefore respectfully request the rejection be withdrawn.

Claim 4 depends from and adds features to independent claim 3; therefore, this claim is patentable for at least the same reasons as described above with respect to claim 3. Applicants therefore respectfully request the rejection be withdrawn.

New claims 8-10

New claims 8-10 depend from claims 1-3, respectively; therefore, these claims are patentable for at least the same reason as described above with respect to claims 1-3. In addition, each of new claims 8-10 recite that "when the sample is placed in the electric field, the impurity migrates in a direction opposite to the nucleic acid." Neither Sheldon nor Asai teach this feature. In particular, Sheldon teaches using a trap, which assumes the contaminant is moving in the same electrical direction as the nucleic acid. Sheldon does not teach adjusting the charge of the impurity so that the contaminant electrophoretically migrates in a direction opposite that of the nucleic acid. For all of the foregoing reasons, new claims 8-10 are patentable over the cited references.

Rejections under 35 U.S.C. §101

Claims 1-4 were provisionally rejected under 35 U.S.C. §101 as claiming the same invention as that of claims 1-4 copending Application No. 10/578,770. Applicants respectfully traverse this rejection. Applicants shall file this month a preliminary amendment in copending Application No. 10/578,770 which shall cancel claims 1-4 of that application. Once claims 1-4 are cancelled in copending Application No.

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HIRAI *et al.*
Appl. No. 10/536,822

10/578,770, Applicants respectfully request the provisional rejection of claims 1-4 of the instant application be withdrawn.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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